FOREST RESEARCH NEWS FOR THE MIDSOUTH

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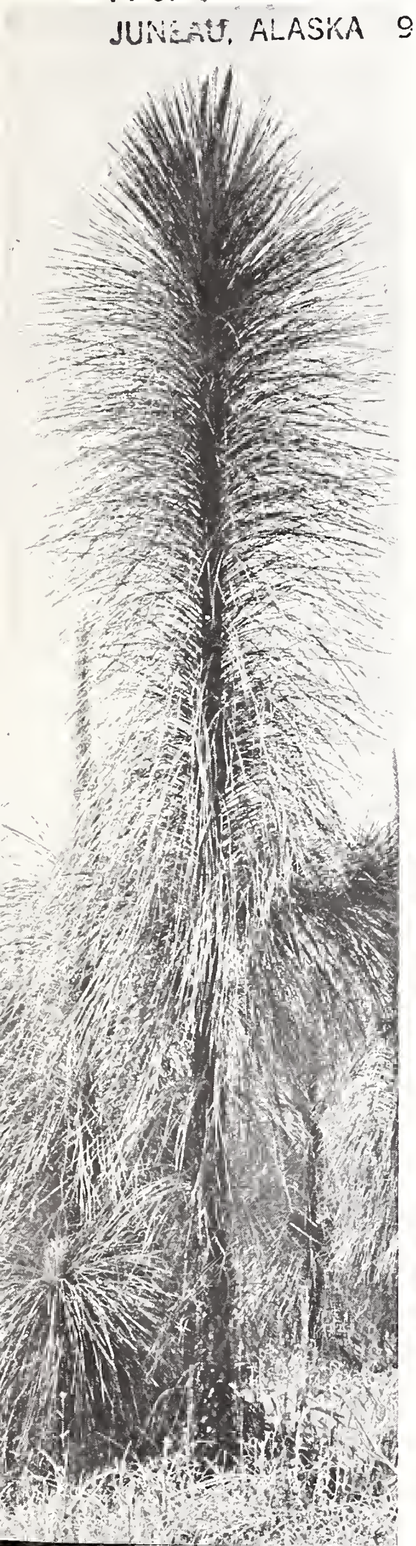
SOUTHERN FOREST EXPERIMENT STATION, FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

Planning, Planting Tomorrow's Trees

A special issue for the National Tree Planting Conference



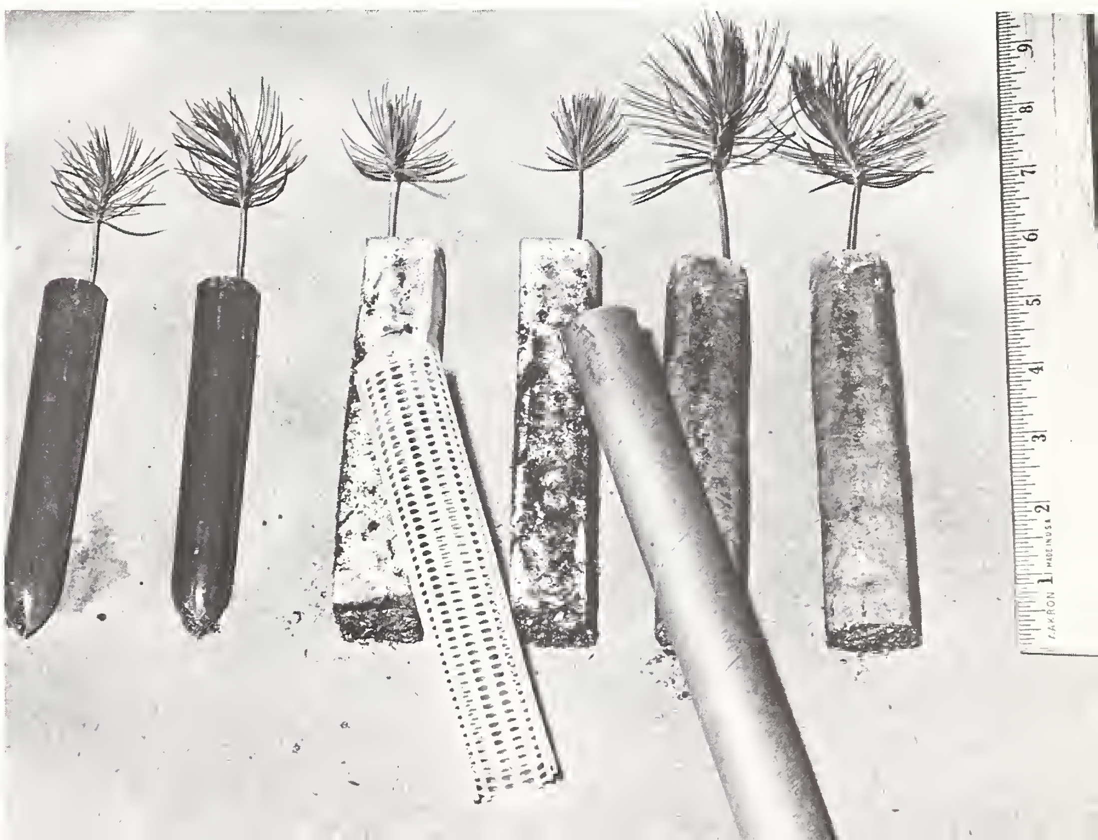
"They just grew that way" won't be said of many of tomorrow's trees. Forest researchers today are working and testing so that tomorrow's trees may grow faster, be freer from disease, give more shade, and produce better wood than they could if left alone.

To provide scientifically derived alternatives for successfully managing *all* the forest's resources is the objective of forest research.

The Southern Forest Experiment Station serves seven Midsouth States, an area yielding nearly one-fourth of the country's timber growth.

The Nation is demanding more from southern forests—more wood, more land for recreation, more beauty. To achieve these benefits, the South cannot rely on natural regeneration, but must put man's ingenuity to work, seeding, planting, and managing forest acres.

The National Tree Planting Conference, being held in New Orleans this October, stresses the need for planting at least 50 million acres of land in the next decade. This issue of FOREST RESEARCH NEWS shows evidence of some of the South's tree planting successes. It also glimpses a few aspects of research to find answers for future problems, so that tomorrow's trees may provide maximum benefits for all.



Flagman guides helicopter when direct-seeding.

How It's Done

In the South today, most new forests are either planted with a machine or direct-seeded.

The planting machine became practical in 1946, relegating hand tools to small jobs. It greatly speeded planting, but the operator finds the work hard, uncomfortable, and unsafe. And, like the hand planter, he can only work about 3 months out of the year.

In direct seeding, pines are sown where the trees are to grow—nurseries and planting labor are avoided. The technique became operational in the middle 1950's, when the Southern Forest Experiment Station developed a repellent coating to protect seed from hungry birds, rodents, and insects. Direct seeding permits reforesting areas that are too wet, steep, or rocky for planting machines, and it is an alternative on many other sites. Longleaf pine, notoriously difficult to plant, is very easy to seed. The most prevalent way to seed is with aircraft, which can reforest 200-300 acres per hour.

But times change, and the techniques of both machine planting and direct seeding are likely to undergo drastic changes.

The repellent seed coating contains some chemicals which—though present at low levels—can perhaps be eliminated altogether. Research has begun on methods of embedding seed in balls of sand, vermiculite, and a hydrophylic polymer. The capsules would be ½ to ¾ inch in diameter, and seed would be placed in the center, where moisture for germination would be fairly uniform. The capsule would also protect the seed from predators.

Scientists are developing a device for aerial seeding in rows. This technique would cut seed requirements by two-thirds from broadcast aerial seeding.

Loblolly pine direct-seeded on site dominated by cull hardwoods.

In planting, the prime challenge is to automate the job and extend the planting season throughout the year. Of several possibilities under study, containerization of seedlings appears most promising.

Three basic approaches are being tested. One utilizes tubes made of paper or plastic filled with soil. A 6- to 8-week-old seedling is planted in the ground

Until researchers developed repellent coating, mice destroyed much of the seed.

along with the container, avoiding root disturbance and planting shock. In a second method, the seedling is grown in wood fiber, peat moss, or polyurethane foam blocks impregnated with nutrients. These too are planted along with the seedlings. A third system, sometimes referred to as plug planting, calls for plastic molds filled with a growing medium. Seedlings, with the medium still attached to their roots, are removed from the molds just before planting time. Molds are resuable.

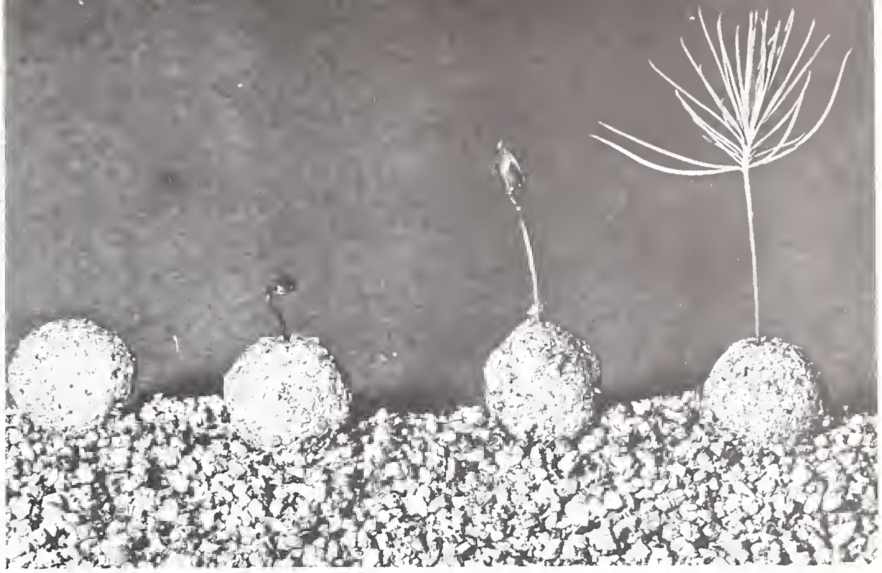
In early trials, some containerized pines were 3 feet tall after their first year in the field —double the growth achieved with nursery stock.

Methods of planting seedlings from the air have been proposed. In one, seedlings are placed in a plastic bomb casing that resembles a seedling tube with fins added.

In hardwood forestry, some trends also are worthy of note. Eastern cottonwood is being intensively cultured by preparing sites thoroughly to eliminate competing vegetation. Cuttings are planted, and in 10 years stands contain about 30 cords of wood per acre.

"Silage sycamore" is a new concept in which cuttings are laid flat in shallow trenches on a cultivated site. Trees from sprouts are harvested with combines in 2 to 5 years. Yields are exceptionally high. This system may also apply to species such as green ash and sweetgum.

In hardwoods as in pines, then, future forests will be started by completely new methods—including some that may seem far-fetched today.



Research has begun on encapsulated seeds.

Containerized seedlings, planted when 6 to 8 weeks old, may grow 3 feet tall during their first year in the field.

Improved Cottonwoods For Planting

Cuttings sprout quickly from nursery-grown or wild trees when set about 16 to 18 inches in the ground so that only 2 to 4 inches show above ground. A blade designed to fit behind a tractor opens a narrow trench the right depth for the cuttings. The machine requires two men and plants about 23 acres per day.

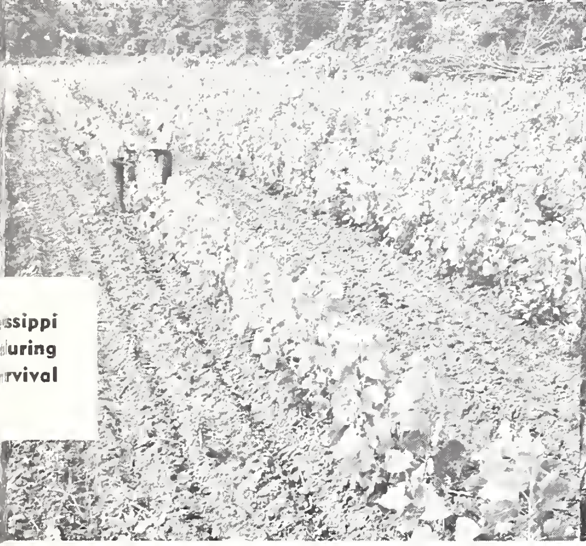
About 750,000 acres in the South are rated as good cottonwood land, but only 35,000 acres have been planted so far. Cuttings recently shipped to nurseries are expected to spur reforestation efforts.

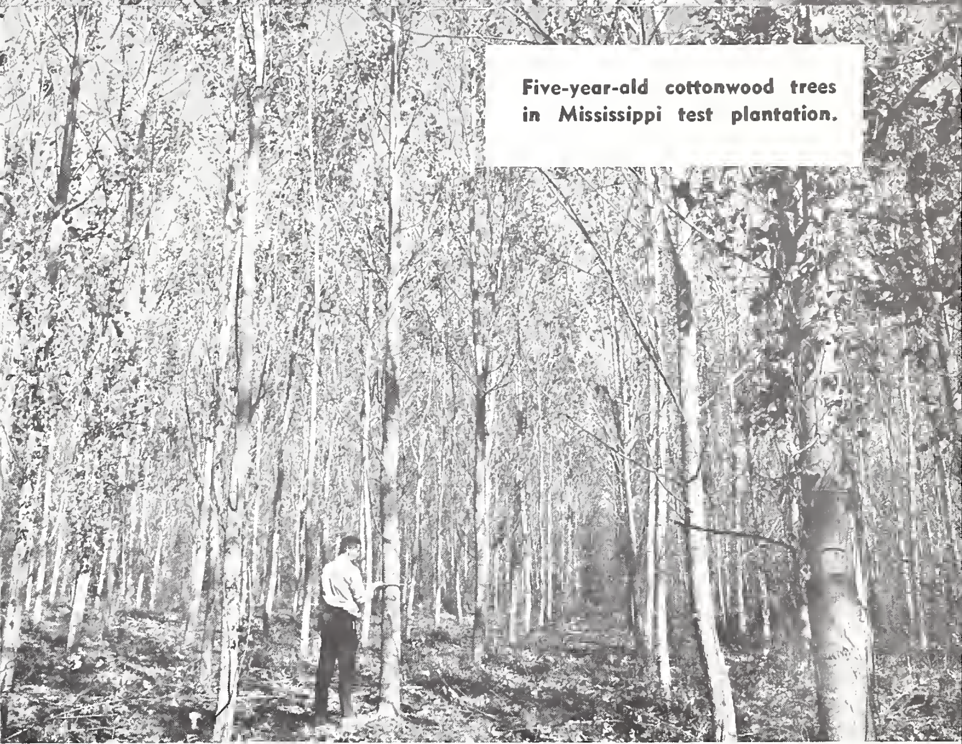
Cottonwood plantation on the Mississippi Delta. Trees must be cultivated during the first year to assure good survival and growth.

Planting stock of genetically improved cottonwoods is about to become a reality for landowners in the South.

Last spring, 615,000 cuttings from select trees were shipped by the USDA Forest Service to nurseries in Arkansas, Kentucky, Louisiana, Mississippi, and Tennessee. With these cuttings as foundation stock, the nurseries will be able to produce millions more. First trees for field planting will be available next spring 1973.

The shipments are the initial payoff of genetics research that the Forest Service began 15 years ago. The research has been centered at the Southern Hardwoods Laboratory of the Southern Forest Experiment Station, in Stoneville, Mississippi. It was here that scientists developed the improved clones from which the 615,000 cuttings were produced. (A clone consists of all trees





Five-year-old cottonwood trees in Mississippi test plantation.

originating with cuttings from a single selected tree. All members of a clone have the same genetic makeup as the original tree.)

When the clones had been selected, the researchers turned 15,000 cuttings over to State and Private Forestry, which had established a nursery for them—also at Stoneville. In 2 years, the original cuttings were multiplied fortyfold.

The clones have been tested in the bottom lands of Midsouth States bordering the Mississippi River. Although ordinary cottonwoods are fast growers—up to 10 feet in height each year—the improved stock has proved capable of growing even faster. Forest scientists point out that these trees will not only produce large quantities of wood and fiber, but can also provide urban dwellers with rapid shade and screening.

To Tame the Rain

An early successs story of research and its application to the land is seen in the Yazoo and Little Tallahatchie River Basins in north-central Mississippi. In the 1930's vast areas lay ravaged and barren, denuded by erosion caused by careless farming on highly erosive soils.

Southern Station researchers discovered that loblolly pine, though not native to the area, grows faster, is better able to survive, and produces more of the litter needed to hold soil in place than any known plant. With this information, 600 million seedlings were planted, chiefly under the Yazoo-Little Tallahatchie Project, a cooperative effort of the Forest Service and the Soil Conservation Service. Pictures on this page show the land before and after pine planting.

Erosion control plantations not only in this area but throughout the hilly South now contain large amounts of wood. Owners are asking if the stands can be harvested and a new crop of trees established without impairing the water resource.

Southern Station researchers are looking for the answer.

Harrison Experimental Forest A Testing Ground for Improved Trees and Wood Protection

The field trip on the final day of the National Tree Planting Conference will include a stop at the Harrison Experimental Forest. Established in 1934, this 3,900-acre forest is one of the major field laboratories of the Southern Forest Experiment Station.

Here geneticists evaluate nursery performance of selected hardwoods—including sycamore, sweetgum, and green ash—before the trees are put in tests elsewhere in the South. Here too is a 1-acre test of Formosan sweetgum, a species that may prove useful for crossing with the American sweetgum, and is notable for spectacular autumn coloring.

A southwide seed source study that includes plantings on the Harrison is showing that striking gains in loblolly and longleaf pine performance can be achieved by selecting seeds from specific localities. The local seed source is not always the best.

On the Harrison also are some of the first diallel mating studies to be attempted with forest trees. One includes nearly all possible crosses of 13 longleaf parents. The planting, which covers 24 acres, is yielding data on inheritance of volume productivity, bole and crown form, branching habits, and pruning ability. A loblolly pine diallel is testing inheritance patterns of parent trees from several locations between Texas and Alabama.

In yet another plantation, fertilization and early cultivation are producing spectacular increases in loblolly pine volume growth—and in the amount of cattle and wildlife forage growing under the trees.

In support of efforts to develop disease-resistant trees, pathologists are studying geographic variation in fusiform rust. Isolates from various areas appear to differ in capacity to infect resistant selections of slash pine. At the Harrison and elsewhere, geneticists and pathologists are also teaming up to learn how to protect against the brown-spot needle blight of longleaf seedlings.

In this nursery progenies of selected pine parents are judged for their resistance or susceptibility to fusiform rust, perhaps the most destructive disease of southern pine forests.

Protecting Wood in Storage and in Use

Scientists are trying to find improved methods of protecting wood products from insects and decay. This means research on many phases of wood in storage and in use—ranging from southern pine log decks to housing.

Woter sproy is preferable to the time-honored method of storing logs in o pond. How long is sproy storoge effective? At the Horrison, logs ore being test-sproyed, some continuolly.

Window frames ore being tested to develop o new method for controlling decoy without adding toxic chemicols. Other tests determine effects of fungi on roofing shingles.

On one oreo of the Horrison Experimentol Forest is the world's lorgest termite-control test. Soil on numerous smoll plots hos been treoted with o voriety of chemicols thot ore difficult for termites to penetrote. Some chemicols, still effective ofter 20 yeors, show little movement in the soil. Findings from these tests ore opplied oround the world.

But better methods seem possible. Perhops the pests con be controlled by opplying repellents to the wood ond soil, by formuloting boits or creoting deterrents to feeding ond digestion or by devising biologicol controls.

Wood destroying beetles cause damage second only to that of termites. How can their attacks be forestalled?

Can decay of wood be prevented without resort to toxic chemicals?

Research now in progress at the Harrison Experimental Forest is expected to provide useful answers to at least some of these questions.